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DEPT. OF TRANSPORTATION
DOCKETS

DEPARTMENT OF TRANSPORTATION (DOT)

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Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2004-19157; Directorate Identifier 2004-NE-30-AD]

RIN 2120-AA64

Airworthiness Directives; Rolls-Royce Deutschland (RRD) (Formerly Rolls-Royce plc)

Tay 650-15 Series Turbofan Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: The FAA proposes to adopt a new airworthiness directive (AD) for certain RRD Tay 650-15 series turbofan engines. This proposed AD would require inspection of the high pressure compressor (HPC) shaft and high pressure turbine (HPT) shaft for spline flank wear. This proposed AD results from a number of occurrences of excessive HPC shaft and HPT shaft spline flank wear discovered during on-wing and in-shop inspections. We are proposing this AD to prevent spline disengagement resulting in an overspeed event, which could lead to an uncontained engine failure and possible damage to the airplane.

DATES: We must receive any comments on this proposed AD by [insert date 60 days after date of publication in the FEDERAL REGISTER].

ADDRESSES: Use one of the following addresses to submit comments on this proposed AD.

- DOT Docket web site: Go to <http://dms.dot.gov> and follow the instructions for sending your comments electronically.
- Government-wide rulemaking web site: Go to <http://www.regulations.gov> and follow the instructions for sending your comments electronically.
- Mail: Docket Management Facility; US Department of Transportation, 400 Seventh Street, S.W., Nassif Building, Room PL-401, Washington, DC 20590-001.
- Fax: (202) 493-2251.
- Hand Delivery: Room PL-401 on the plaza level of the Nassif Building, 400 Seventh Street, S.W., Washington, DC, between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

You can get the service information identified in this proposed AD from Rolls-Royce Deutschland Ltd & Co KG, Eschenweg 11, D-15827 Dahlewitz, Germany; telephone 49 (0) 33-7086-1768; fax 49 (0) 33-7086-3356.

You may examine the comments on this proposed AD in the AD docket on the Internet at <http://dms.dot.gov>.

FOR FURTHER INFORMATION CONTACT: Ian Dargin, Aerospace Engineer, Engine Certification Office, FAA, Engine and Propeller Directorate, 12 New England Executive Park, Burlington, MA 01803-5299; telephone (781) 238-7178; fax (781) 238-7199.

SUPPLEMENTARY INFORMATION:

Docket Management System (DMS)

We have implemented new procedures for maintaining AD dockets electronically. As of May 17, 2004, we post new AD actions on the DMS and assign a DMS docket number. We track each action and assign a corresponding Directorate identifier. The DMS docket No. is in the form "Docket No. FAA-200X-XXXXX." Each DMS docket also lists the Directorate identifier ("Old Docket Number") as a cross-reference for searching purposes.

Comments Invited

We invite you to submit any written relevant data, views, or arguments regarding this proposal. Send your comments to an address listed under ADDRESSES. Include "Docket No. FAA-2004-19157; Directorate Identifier 2004-NE-30-AD" in the subject line of your comments. We specifically invite comments on the overall regulatory, economic, environmental, and energy aspects of the proposed AD. We will consider all comments received by the closing date and may amend the proposed AD in light of those comments.

We will post all comments we receive, without change, to <http://dms.dot.gov>, including any personal information you provide. We will also post a report summarizing each substantive verbal contact with FAA personnel concerning this proposed AD. Using the search function of the DMS web site, anyone can find and read the comments in any of our dockets, including the name of the individual who sent the comment (or signed the comment on behalf of an association, business, labor union, etc.). You may review the

DOT's complete Privacy Act Statement in the Federal Register published on April 11, 2000 (65 FR 19477-78) or you may visit <http://dms.dot.gov>.

We are reviewing the writing style we currently use in regulatory documents. We are interested in your comments on whether the style of this document is clear, and your suggestions to improve the clarity of our communications that affect you. You can get more information about plain language at <http://www.faa.gov/language> and <http://www.plainlanguage.gov>.

Examining the AD Docket

You may examine the docket that contains the proposal, any comments received, and any final disposition in person at the DMS Docket Offices between 9:00 a.m. and 5:00 p.m., Monday through Friday, except Federal holidays. The Docket Office (telephone (800) 647-5227) is located on the plaza level of the Department of Transportation Nassif Building at the street address stated in ADDRESSES. Comments will be available in the AD docket shortly after the DMS receives them.

Discussion

The Civil Aviation Authority (CAA), which is the airworthiness authority for the United Kingdom, recently notified us that an unsafe condition might exist on certain RRD Tay 650-15 series turbofan engines. The CAA advises that the spline flanks on the HPC shaft and HPT shaft may be developing excessive wear. The amount of wear is directly related to the amount of relative movement between the HPC and an immobilized HPT. You can detect wear by inspecting the engine to determine the amount of relative movement between the HPC and an immobilized HPT. On-wing and in-shop inspections found excessive spline flank wear on HPC shafts and HPT shafts that

incorporated Service Bulletin (SB) No. TAY-72-1327 (hard coated abutment face) and HPC shafts and HPT shafts that did not incorporate SB No. TAY-72-1327.

Relevant Service Information

We have reviewed and approved the technical contents of RRD SB No. TAY-72-1485, Revision 2, dated March 21, 2003 that describes procedures for inspecting the flanks on the HPC shaft and HPT shaft for wear. The CAA classified the initial Rolls-Royce plc (RR) SB as mandatory and issued airworthiness directive CAA 001-01-2002, dated January 11, 2002 in order to ensure the airworthiness of these RR engines in the United Kingdom. Subsequently, the certification responsibility was transferred to RRD and Revision 1 and Revision 2 were reclassified to "Recommended" by the Luftfahrt-Bundesamt (LBA), which is the aviation authority for Germany.

Differences Between This Proposed AD and the Manufacturer's Service Information

The RRD SB No. TAY-72-1485, Revision 2, dated March 21, 2003 specifies compliance times based on the date of receipt of the SB. We have mandated compliance times based on the effective date of this proposed AD.

At initial inspection, if the HPC shaft or HPT shaft has accumulated 3,000 flight cycles or more, RRD SB No. TAY-72-1485, dated January 11, 2002, specifies compliance within 12 months. At initial inspection, if the HPC shaft or HPT shaft has accumulated 3,000 flight cycles or more, we specify compliance within six months from the effective date of the final rule.

FAA's Determination and Requirements of the Proposed AD

This engine model, manufactured in Germany, is type-certificated for operation in the United States under the provisions of section 21.29 of the Federal Aviation Regulations (14 CFR 21.29) and the applicable bilateral airworthiness agreement. In keeping with this bilateral airworthiness agreement, the CAA and LBA have kept us informed of the situation described above. We have examined the findings of the CAA and LBA, reviewed all available information, and determined that AD action is necessary for products of this type design that are certificated for operation in the United States. We are proposing this AD, which would require inspecting the spline flanks on the HPC shaft and HPT shaft for wear. The proposed AD would require you to use the service information described previously to perform these actions.

Costs of Compliance

There are about 390 RRD Tay 650-15 series turbofan engines of the affected design in the worldwide fleet. We estimate that 172 engines installed on airplanes of U.S. registry would be affected by this proposed AD. We also estimate that it would take about 4 work hours per engine to perform the proposed actions, and that the average labor rate is \$65 per work hour. Based on these figures, we estimate the total cost of the proposed AD to U.S. operators, per inspection cycle, to be \$44,720. We also estimate, for the HPC shaft of 172 engines to be replaced at teardown, with a parts cost of approximately \$13,862 per shaft, the total cost of the proposed AD to U.S. operators to be \$2,384,264.

Regulatory Findings

We have determined that this proposed AD would not have federalism implications under Executive Order 13132. This proposed AD would not have a substantial direct effect on the States, on the relationship between the national Government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that the proposed regulation:

1. Is not a "significant regulatory action" under Executive Order 12866;
2. Is not a "significant rule" under the DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979); and
3. Would not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

We prepared a summary of the costs to comply with this proposal and placed it in the AD Docket. You may get a copy of this summary at the address listed under ADDRESSES.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Safety.

The Proposed Amendment

Under the authority delegated to me by the Administrator, the FAA proposes to amend 14 CFR part 39 as follows:

PART 39 - AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. The Federal Aviation Administration (FAA) amends § 39.13 by adding a new airworthiness directive (AD) to read as follows:

Rolls–Royce Deutschland Ltd & Co KG (RRD) (Formerly Rolls-Royce plc): Docket No. FAA-2004-19157; Directorate Identifier 2004-NE-30-AD.

Comments Due Date

(a) The FAA must receive comments on this AD action by [insert date 60 days after date of publication in the FEDERAL REGISTER].

Affected ADs

(b) None.

Applicability

(c) This AD applies to RRD Tay 650-15 series turbofan engines. These engines are installed on, but not limited to, Fokker F100 airplanes.

Unsafe Condition

(d) This AD results from a number of occurrences of excessive high pressure compressor (HPC) and high pressure turbine (HPT) shaft spline wear and spline flank wear discovered during on-wing and in-shop inspections. We are issuing this AD to prevent spline disengagement resulting in an overspeed event, which could lead to an uncontained engine failure and possible damage to the airplane.

Compliance

(e) You are responsible for having the actions required by this AD performed within the compliance times specified unless the actions have already been done.

Initial Visual Inspection of the HPC Shaft and HPT Shaft Splines

(f) Within the compliance times specified in Table 1 of this AD, perform initial inspections of the HPC shaft splines and HPT shaft splines of RRD Tay 650-15 series turbofan engines. Use paragraph 3.A. of Accomplishment Instructions of RRD Service Bulletin (SB) No. TAY-72-1485, Revision 2, dated March 21, 2003, to do the inspections. Calculate spline wear using Appendix 1, paragraph 4.K., of RRD SB No. TAY-72-1485, Revision 2, dated March 21, 2003.

Table 1 – HPC Shaft Splines and HPT Shaft Splines Inspection Schedule

Current shaft life	Action
(1) If the HPC shaft or HPT shaft has accumulated 3,000 cycles-since-new (CSN) or more on the effective date of this AD.	Inspect HPC shaft splines and HPT shaft splines for wear within six months after the effective date of this AD, unless previously done.
(2) If the HPC shaft or HPT shaft has accumulated fewer than 3,000 CSN on the effective date of this AD.	Wait until the HPC shaft or HPT shaft has accumulated 3,000 flight cycles, then inspect the HPC shaft splines and HPT shaft splines for wear within 300 cycles-since-last visual inspection (CSLI) or remainder of 12 months from the effective date of this AD, whichever is greater.

(g) Disposition the HPC shaft, HPT shaft, or engine as specified in Table 2 of this AD.

Table 2 – Visual Inspection Criteria

Inspection limits	Disposition
(1) If spline wear is 0.1 inch or greater.	Remove engine from service within 50 cycles-since-last visual inspection (CSLI).
(2) If spline wear is greater than or equal to 0.06 inch but less than 0.1 inch.	Remove engine from service within 500 CSLI.

Inspection limits	Disposition
(3) If spline wear is greater than or equal to 0.03 inch but less than 0.06 inch.	Inspect HPC shaft and HPT shaft using the intervals in paragraph (h)(1) of this AD.
(4) If spline wear is less than 0.03 inch.	Inspect HPC shaft and HPT shaft using the intervals in paragraph (h)(2) of this AD.

Repetitive Visual Inspection of the HPC Shaft and HPT Shaft Splines

(h) Perform repetitive inspections of the HPC shaft splines and HPT shaft splines of RRD Tay 650-15 series turbofan engines. Use paragraph 3.A. of Accomplishment Instructions with Appendix 1 of RRD SB No. TAY-72-1485, Revision 2, dated March 21, 2003, to do the inspections. Calculate spline wear using Appendix 1, paragraph 4.K., of RRD SB No. TAY-72-1485, Revision 2, dated March 21, 2003.

(1) If wear measured in paragraph (f) of this AD was greater than or equal to 0.03 inch but less than 0.06 inch, repetitively inspect HPC shaft and HPT shaft within 1,000 cycles-since-last visual inspection (CSLI).

(2) If wear measured in paragraph (f) of this AD was less than 0.03 inch, repetitively inspect HPC shaft and HPT shaft within 5,500 CSLI.

(i) Disposition the HPC shaft, HPT shaft, or engine as specified in Table 2 of this AD.

Previous Credit

(j) Previous credit is allowed for performing the initial inspections in paragraph (f) of this AD, that were done using the Accomplishment Instructions of one of the following, before the effective date of this AD:

(1) SB No. TAY-72-1485, dated January 11, 2002

(2) SB No. TAY-72-1485, Revision 1, dated January 29, 2003

(3) SB No. TAY-72-1485, Revision 2, dated March 21, 2003


Material Incorporated by Reference

(k) None.

Related Information

(l) Civil Aviation Authority (CAA) airworthiness directive 001-01-2002, dated January 11, 2002, also addresses the subject of this AD.

Issued in Burlington, Massachusetts, on September 24, 2004.


Francis A. Favara,
Acting Manager, Engine and Propeller Directorate,
Aircraft Certification Service.